

Bailey

SECTION
E41-2

PRODUCT INSTRUCTIONS

ELECTRIC PRESSURE TRANSMITTER

TYPE KP12



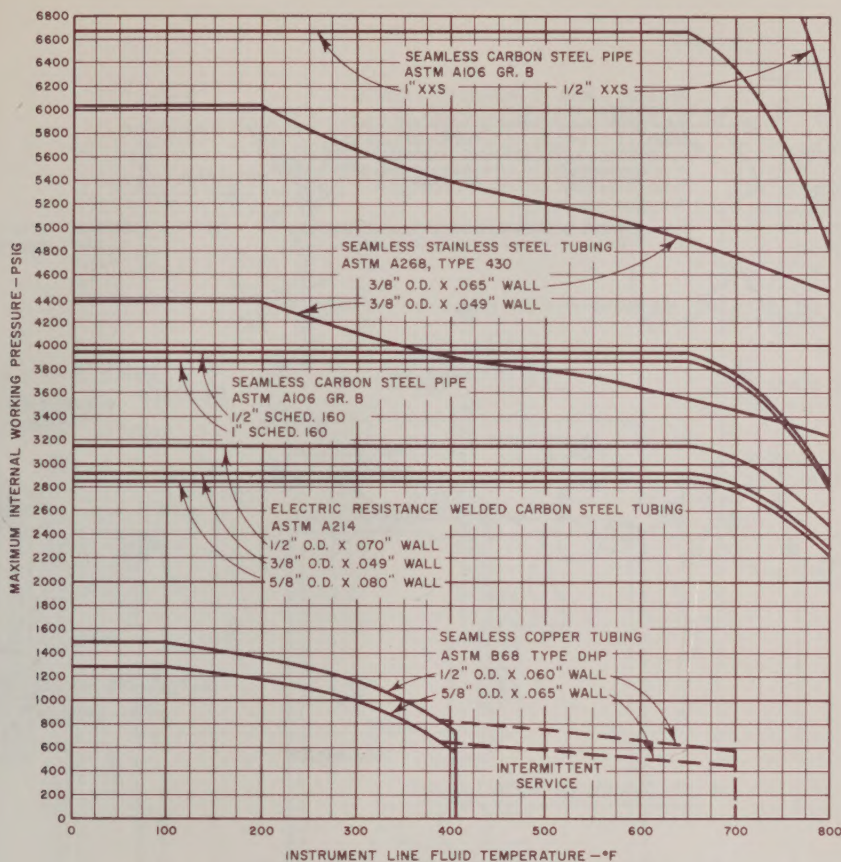
BAILEY METER COMPANY • WICKLIFFE, OHIO 44092

INDEX

	<u>Page</u>
INSTALLATION	7
Unpacking	7
Transmitter Location	7
Mounting	7
Connecting Tubing	7
Connecting Wiring	7
Pre-Service Adjustment Check, Model K	7
Pre-Service Adjustment Check, Model P	10
OPERATION	10
Starting Up	10
Shutting Down	10
Blowing Down Tubing and Piping	11
ROUTINE MAINTENANCE	11
Periodically	11
CORRECTIVE MAINTENANCE	11
Transmitter Operation Checks	11
Disassembly	11
Bourdon Tube	11
CALIBRATION OF TRANSMITTER	12
Calibration Check	12
Transmitting Mechanism	12
Indicating Mechanism	14
Bourdon Tube Stops	15
DESCRIPTION OF OPERATION	15
REPLACEMENT PARTS	17
Ordering Individual Parts	17
EXPLANATION OF NOMENCLATURE	18

CROSS REFERENCES

<u>Instrument or Equipment</u>	<u>Instruction Section</u>
Type KM5 or WM5 Recorder or Indicator	E12-3
Class BL Telemeter Receiver	E12-73
Class JL Telemeter Receiver	E12-19



NOTES

1. The curve representing the rating of the tubing selected must lie above the intersection of lines representing the actual expected maximum sustained temperature and pressure.

2. Tubing materials, dimensions, and specifications are those of tubing stocked by Bailey Meter Company. In some cases, larger sizes are recommended. Several commercial pipe sizes have been shown for convenience.

3. If other materials or sizes or wall thicknesses are used, allowable working pressures must be calculated as provided for in code.

4. Temperatures are instrument line fluid temperatures. In steam service, tubing preceding blowdown valves shall be suitable for saturated steam temperature at the design main line pressure.

5. Copper tubing may be used in dead end steam or water service up to design pressures and temperatures shown by the dotted curves provided that the temperature within the lines for continuous service does not exceed 406F.

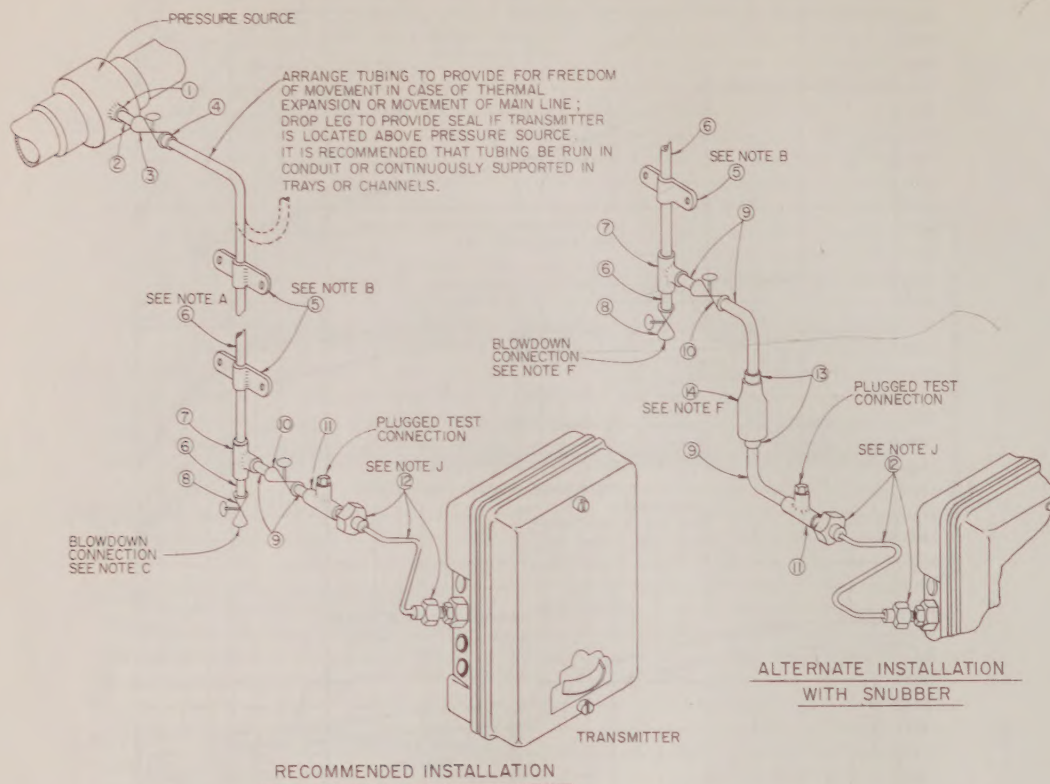
6. Pressure and/or temperature may exceed the normal design conditions occasionally provided the pressure does not exceed the allowable value for the temperature involved by more than:

- (1) 15% during 10% of the operating period.
- (2) 20% during 1% of the operating period.

7. The recommended minimum wall thickness for socket welded tubing is .065".

8. Tubing wall thicknesses are not calculated to provide additional thickness that may be required for mechanical strength. Tubing should be continuously supported in conduit, trays or channels.

FIGURE 1 - Selection Chart for Instrument Piping Based on Code for Pressure Piping, ASA B31.1



MATERIAL --- SEE NOTE H

CONNECTING TUBING NOTES

- A. KEEP CONNECTING LINE AS SHORT AS IS PRACTICAL. EQUIVALENT VERTICAL HEAD (VERTICAL DISTANCE BETWEEN PRESSURE SOURCE AND TRANSMITTER) IN PSIG MUST BE LESS THAN 20% OF RANGE OF TRANSMITTER.
- B. DO NOT ANCHOR TUBE SO TIGHTLY THAT IT CANNOT EXPAND DURING BLOWDOWN.
- C. IF TRANSMITTER IS PANEL MOUNTED, LOCATE BLOWDOWN CONNECTION OUTSIDE PANEL.
- D. ALLOW AT LEAST 2 FEET OF FREE TUBING BETWEEN TRANSMITTER AND ANCHORING DEVICE CLOSEST TO TRANSMITTER.
- E. MOUNT ANCHORING DEVICES CLOSEST TO TRANSMITTER ON SAME STRUCTURE ON WHICH TRANSMITTER IS MOUNTED.
- F. USE PRESSURE SNUBBER FOR ALL WATER FLOW, GAS FLOW, HIGH PRESSURE (1500 PSIG OR ABOVE), HIGH VELOCITY STEAM FLOW, ANY FLOW WHERE A PUMP IS USED, OR WHENEVER RAPID PRESSURE OSCILLATIONS ARE ANTICIPATED.
- H. ALL SIZES AND MATERIALS LISTED CONFORM TO THE LATEST REVISION OF THE CODE FOR PRESSURE PIPING, ASA B31.1. WHERE MATERIALS ARE NOT NOTED OR WHERE DIFFERENT FITTINGS ARE TO BE USED, ALWAYS SELECT MATERIALS THAT CONFORM TO THIS CODE. DO NOT CHANGE SIZE OF ANY ITEM TO ONE WHICH WILL NOT MEET THE CODE.
- J. CONNECT SHORT LENGTH OF FLEXIBLE TUBING, ITEM 12, (FURNISHED) TO TRANSMITTER. WHEN CONNECTING TUBING, DO NOT EXERT UNDUE STRAIN ON TRANSMITTER CASING. TO REDUCE EFFECT OF VIBRATION, TUBING SHOULD NOT BE TAUT; ADD LOOP IF POSSIBLE.

1. 1/2", 3/4", OR 1" WELDING ADAPTER, SIZE DEPENDING ON SIZE OF NIPPLE, ITEM 2.
2. 1/2" NIPPLE, FOR SERVICE UP TO 900 PSIG OR 800F.
3/4" NIPPLE } FOR SERVICE 901 PSIG OR 801F OR HIGHER.
1" NIPPLE }
3. 1/2", 3/4", OR 1" GLOBE VALVE, SUITABLE FOR MAXIMUM SERVICE PRESSURE AND TEMPERATURE, SIZE DEPENDING ON SIZE OF NIPPLE, ITEM 2.
4. FITTING OR BUSHING, IF REQUIRED, SIZE DEPENDING ON SIZES OF VALVE, ITEM 3, AND TUBING, ITEM 6.
5. ANCHORING CLIP OR OTHER DEVICE.
6. TUBING, WITH NECESSARY FITTINGS (SEE SELECTION CHART)
1/2" OD TUBING OR 3/8" PIPE (OR LARGER) FOR SERVICE UP TO 1500 PSIG
5/8" OD TUBING OR 1/2" PIPE (OR LARGER) FOR SERVICE 1501 PSIG OR HIGHER
7. REDUCING TEE, 1/4" OUTLET TO INSTRUMENT, SIZE OF STRAIGHT-THRU SECTION DEPENDING ON SIZE OF TUBING, ITEM 6.
8. GLOBE NEEDLE VALVE, SUITABLE FOR MAXIMUM SERVICE PRESSURE AND TEMPERATURE, SIZE DEPENDING ON SIZE OF TUBING, ITEM 6.
9. 1/4" STEEL NIPPLE, LENGTH AS REQUIRED, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
10. 1/4" GLOBE NEEDLE VALVE, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
11. 1/4" STEEL TEE AND PLUG, (SUITABLE FOR MAXIMUM SERVICE PRESSURE AT 100F).
12. FLEXIBLE TUBING CONNECTOR, PT. NO. 681853-2, 18" LONG STAINLESS STEEL TUBING WITH 1/4" MALE CONNECTORS AT EACH END, SUITABLE FOR 5000 PSIG AT 100F, FURNISHED BY BAILEY METER COMPANY.
13. STEEL BUSHING, IF REQUIRED, DEPENDING ON SIZE OF SNUBBER, ITEM 14.
14. 1/4" OR 1/2" PRESSURE SNUBBER, ASHCROFT OR EQUAL.

FIGURE 2 - Recommended Connecting Tubing and Piping Installation

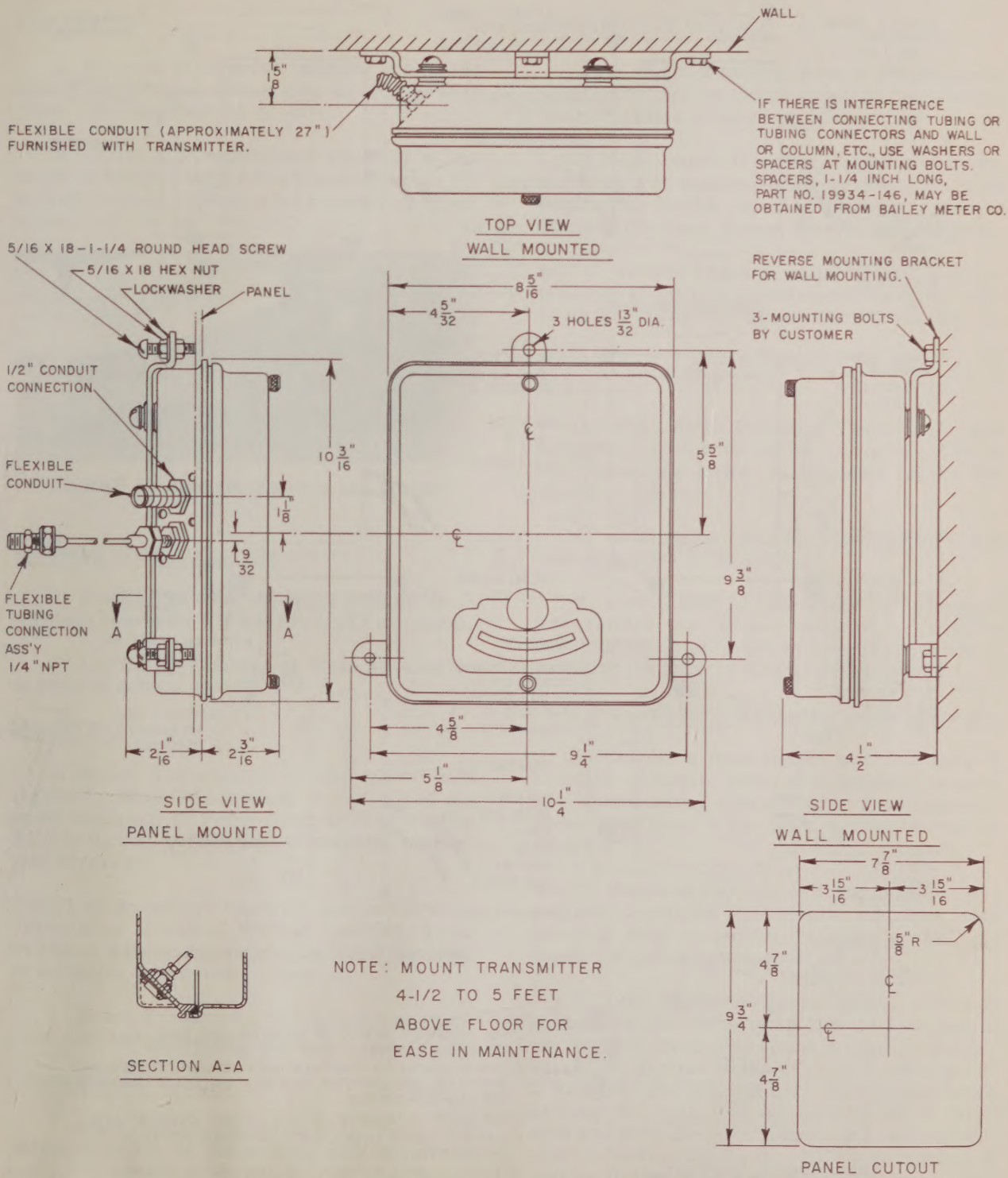
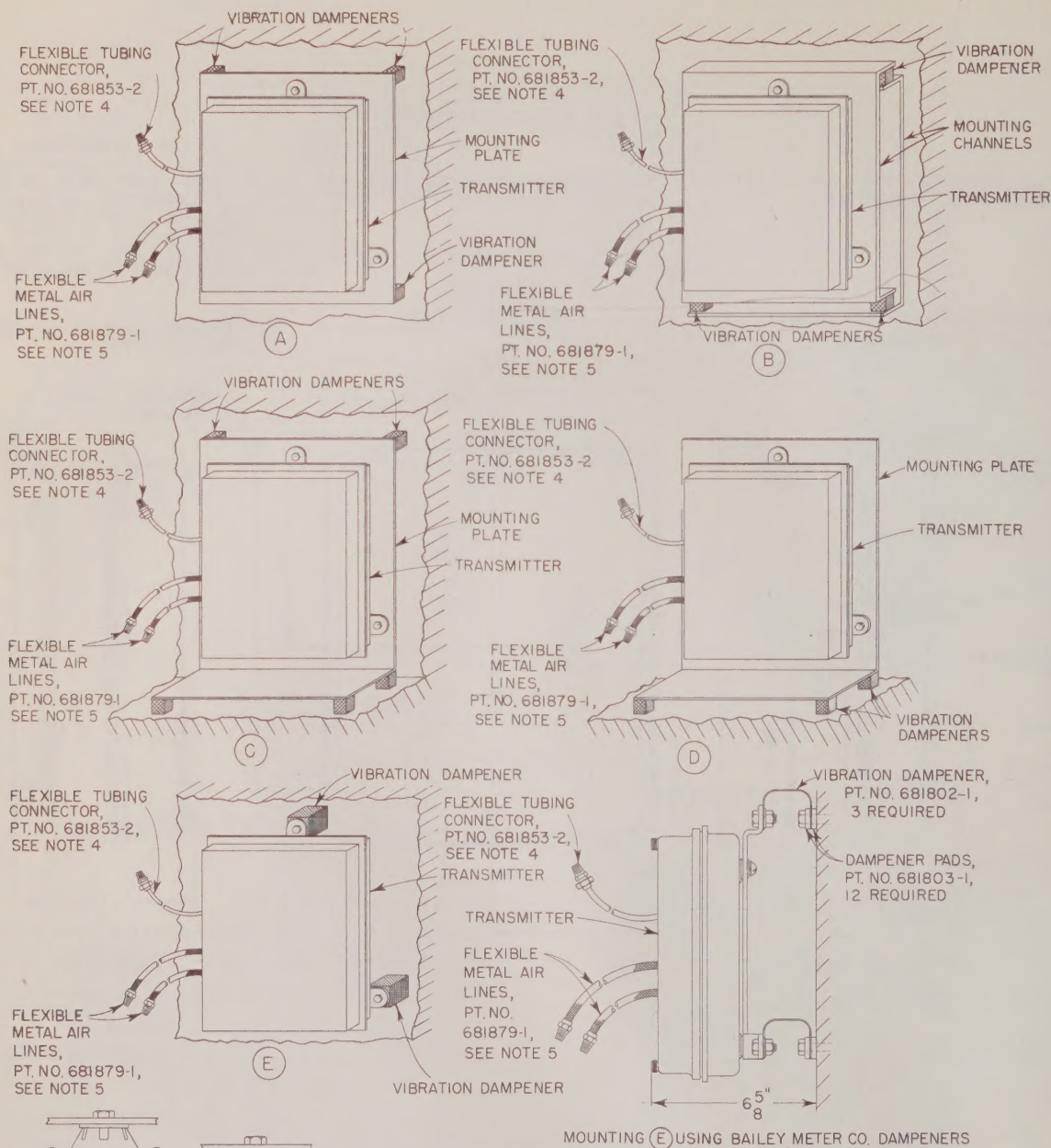


FIGURE 3 - Mounting Dimensions for Type KP12 Transmitter



NOTES

1. USE SUGGESTED METHOD OF MOUNTING THAT BEST APPLIES, OR CONSULT VIBRATION DAMPENER MANUFACTURER.
2. TYPE OF VIBRATION DAMPENER USED DEPENDS ON FREQUENCY, AMPLITUDE, AND DIRECTION OF VIBRATION. CHECK MANUFACTURER FOR EACH APPLICATION.
3. FOR DAMPENER MOUNTING DETAILS, CONSULT DAMPENER MFR.
4. FLEXIBLE TUBING CONNECTOR IS FURNISHED WITH EACH TRANSMITTER.
5. FLEXIBLE METAL AIR LINES, 18" LONG, MAY BE OBTAINED FROM BAILEY METER CO.

FIGURE 4 - Suggested Methods of Mounting to Eliminate Vibration

INSTALLATION

UNPACKING

1. With cover removed, remove screw and spacer as noted on red warning tag (Figure 5) in lower right hand corner of case.

2. NOTE: If an adjustment check at a test bench is desired before the Transmitter is installed, refer to "Pre-Service Adjustment Check" below.

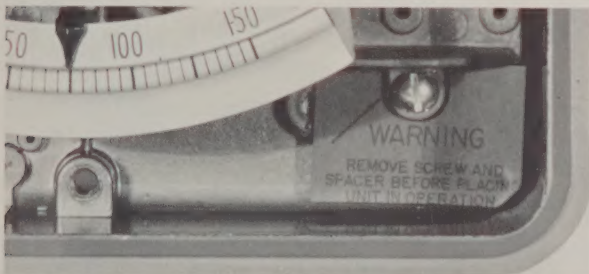


FIGURE 5 - Removing Screw and Spacer

TRANSMITTER LOCATION

1. Locate Transmitter where ambient temperature is between 40F and 140F (68F optimum).
2. Locate Transmitter as close as possible to point of measurement.

MOUNTING

1. Mount Transmitter in accordance with Figure 3. Mounting bracket is assembled for panel mounting. If Transmitter is to be wall or surface mounted, reverse the mounting bracket (see Figure 3).

CAUTION: Excessive vibration may occur when Transmitter is wall or surface mounted. Refer to Figure 4 for suggested methods for mounting Transmitter to eliminate vibration.

2. Mount Transmitter 4-1/2 to 5 feet above floor for ease of maintenance.

CONNECTING TUBING

1. Make tubing connections to measured pressure source in accordance with Figures 1 and 2.

2. Check all tubing connections for leakage (while under pressure) with a leak detecting solution.

CONNECTING WIRING

1. A length of flexible conduit which shields color-coded wires extends from the Transmitter case. Run this conduit to a junction box.

2. Make external wiring connections in accordance with applicable wiring diagrams in the Instruction Section covering the Receiver for the Transmitter (see "Cross References", page 2).

NOTE: Normal supply voltage for the primary windings of the Transmitter (and Receiver) MCT is 59 volts ac for both Model K and Model P coils.

PRE-SERVICE ADJUSTMENT CHECK MODEL K

The Type KP12 Pressure Transmitter was accurately calibrated for the range specified on the nameplate prior to shipment. Make the checks below to:

1. make certain that the calibration has not been disturbed in transit, or
2. compensate for the error introduced if Transmitter for measurement of condensable vapor or liquid pressure is located either above or below the point of measurement.

If Transmitter measures air or gas pressure:

1. Connect a dead weight tester (Figure 6) or other accurate, adjustable pressure source to flexible tubing (shipped with Transmitter). Refer to Figure 9 for MCT schematic wiring diagram.

NOTE: Before performing calibration check, energize Transmitter and Receiver circuit at least one-half hour to permit Transmitter MCT to reach its operating temperature.

2. Turn Receiver power switch OFF and manually rotate Receiver slidewire disc against zero travel limit stop (refer to applicable Instruction Section under "Cross References"). If Receiver pen is not at zero chart, make a fine adjustment of the link between Receiver drive arm and pen yoke (see "Adjustment and Calibration" in Instruction Section E12-3 for method of making linkage adjustments).

3. Apply minimum measured range pressure to Bourdon tube. Apply power to Receiver and Transmitter circuit.

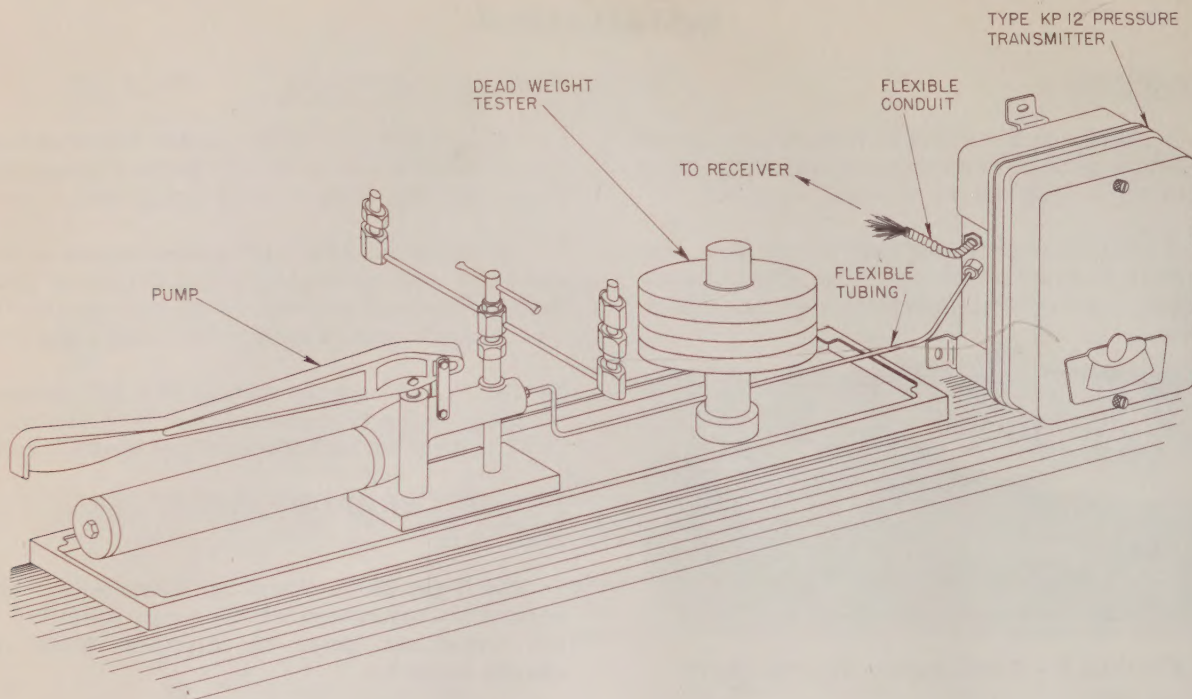


FIGURE 6 - Recommended Calibration Set Up

4. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 7) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

5. If Transmitter indicating pointer does not read minimum scale ($\pm 1/32$ -inch) turn pointer zero adjustment screw (Figure 7) clockwise to decrease reading or counterclockwise to increase reading.

6. Apply midrange and maximum measured range pressure to Bourdon tube. Observe (1) Receiver Chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect Transmitter from calibration set up and place in service as outlined under "Operation". If readings are incorrect, refer to "Calibration of Transmitter", page 12.

If Transmitter measures condensable vapor or liquid pressure and is located below the point of measurement:

1. Connect a dead weight tester (Figure 6) or other accurate, adjustable pressure source to flexible tubing (shipped with Transmitter). Refer to Figure 9 for MCT schematic wiring diagram.

NOTE: Before performing calibration check, energize Transmitter and Receiver circuit at least one-half hour to permit Transmitter MCT to reach its operating temperature.

2. Turn Receiver power switch OFF and manually rotate Receiver slidewire disc against zero travel limit stop (refer to applicable Instruction Section under "Cross References"). If Receiver pen is not at zero chart, make a fine adjustment of the link between Receiver drive arm and pen yoke (see "Adjustment and Calibration" in Instruction Section E12-3 for method of making linkage adjustment).

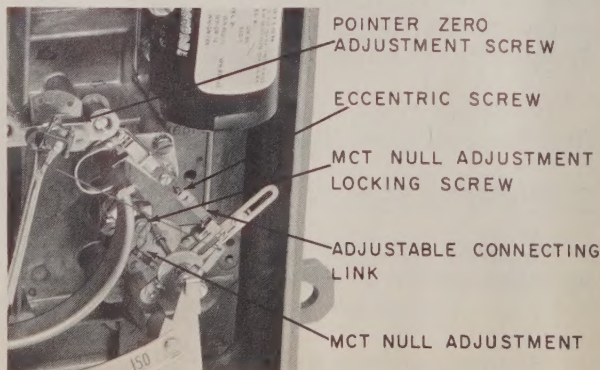


FIGURE 7 - Pre-Service Adjustments
(air or gas pressure)

NOTE: When Transmitter is located below the point of measurement, a head equivalent to the vertical distance between the Transmitter and pressure source will always be present. Therefore, when placed in service with (1) shutoff valve at point of measurement closed, (2) connecting tubing filled with condensate or liquid, and (3) tubing vented at pressure source, the indicating pointer will read a value greater than zero scale. To compensate for this error when making the pre-service adjustment check at a test bench, calculate the value of the head as outlined in step 3 below.

3. EXAMPLE:

Distance from pressure source to Transmitter = 10 feet

Weight of one foot of water = .433 psi

Corrected head value = $10 \times .433 = 4.33$ psig

4. Apply corrected head value to Transmitter. Observe indicating pointer reading. Turn eccentric screw on adjustable connecting link (Figure 8) until pointer reads zero scale.

5. Apply minimum measured range pressure plus corrected head value to Bourdon tube. Apply power to Receiver and Transmitter circuit.

6. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 8) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

7. If Transmitter indicating pointer does not read minimum scale ($\pm 1/32$ -inch), turn pointer zero adjustment screw (Figure 8) clockwise to decrease reading or counterclockwise to increase reading.

8. Apply midrange and maximum measured range pressures plus corrected head value to Bourdon tube. Observe (1) Receiver chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect Transmitter from calibration setup and place in service as outlined under "Operation". If readings are incorrect, refer to "Calibration of Transmitter", page 12.

If Transmitter measures condensable vapor or liquid pressure and is located above the point of measurement:

1. Perform steps 1 and 2 above.

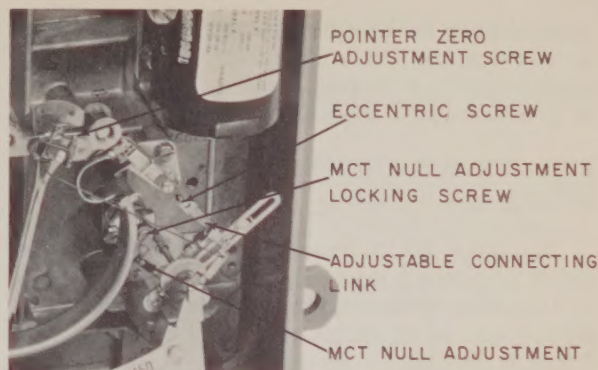


FIGURE 8 - Pre-Service Adjustments
(vapor or liquid pressure)

NOTE: When Transmitter is located above the point of measurement, a negative head equivalent to the vertical distance between the Transmitter and pressure source will always be present. Therefore when placed in service with (1) shutoff valve at point of measurement closed, (2) connecting tubing filled with condensate or liquid, and (3) tubing vented at Transmitter, the indicating pointer will read a value less than maximum scale (with maximum measured range pressure applied). To compensate for this error when making the pre-service adjustment check at a test bench, calculate the value of the head as outlined in step 3 above.

2. Apply maximum measured range pressure minus corrected head value to Bourdon tube. Observe indicating pointer reading. Turn eccentric screw on adjustable connecting link (Figure 8) until pointer reads maximum scale.

3. Apply minimum measured range pressure minus corrected head value to Bourdon tube. Apply power to Receiver and Transmitter circuit.

4. If Receiver pen does not read minimum chart, loosen Transmitter MCT null adjustment locking screw (Figure 8) and turn MCT null adjustment to obtain correct reading. Retighten locking screw.

5. If Transmitter indicating pointer does not read minimum scale ($\pm 1/32$ -inch), turn pointer zero adjustment screw (Figure 8) clockwise to decrease reading or counterclockwise to increase reading.

6. Apply midrange and maximum measured range pressures minus corrected head value to Bourdon tube. Observe (1) Receiver chart readings and (2) Transmitter indicating pointer readings. If readings are correct, disconnect

Transmitter from calibration set up and place in service as outlined under "Operation." If readings are incorrect, refer to "Calibration of Transmitter", page 12.

PRE-SERVICE ADJUSTMENT CHECK MODEL P

The Type KP12 Pressure Transmitter, Model P includes a double purpose coil consisting of two sets of secondary windings (Figure 9). Either set of windings may be connected to a Class B or Class J Receiver.

The set of secondary windings whose code is identical to the color code for the Model K, single purpose coil, is the MCT base signal (signal to which Transmitter was factory calibrated). The other set of secondary windings provides an output which transmits a proportional signal to other associated Class B or Class J remote Receivers.

Therefore, when checking the calibration of a Type KP12, Model P Transmitter, select the set of secondaries whose color code is identical

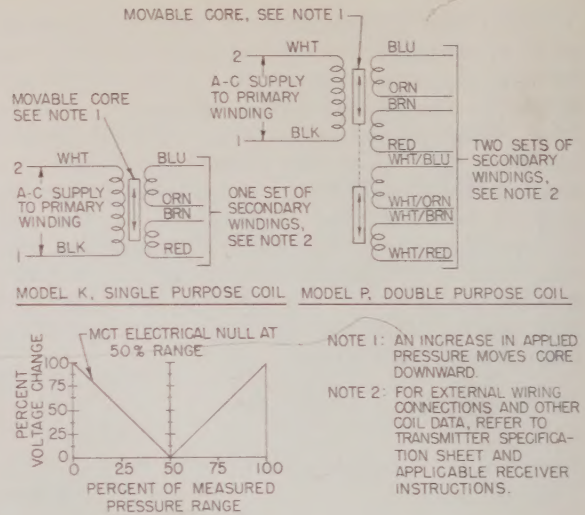


FIGURE 9 - Schematic of Type KP12 MCT

to the color code for the Model K (single purpose coil) and perform the "Pre-Service Adjustment Check, Model K" as outlined on page 7.

OPERATION

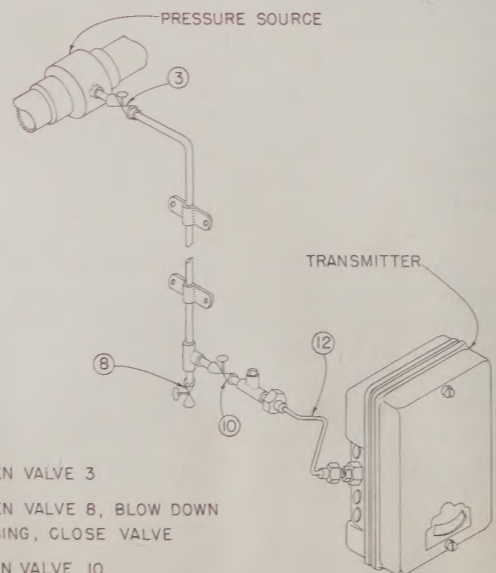
STARTING UP (see Figure 10)

1. Make certain that all valves are closed.
2. Open valve (3) at pressure source.
3. Slowly open blowdown valve (8) and blow down tubing or piping until clear. Then close piping valve (8).
4. When measuring steam pressure, allow tubing and piping to cool to room temperature.
5. Slowly open instrument valve (10). (Indicating pointer should read measured pressure value.)
6. Turn Receiver power switch ON to energize Transmitter and Receiver circuit.

SHUTTING DOWN (see Figure 10)

1. Close instrument valve (10) and valve (3) at pressure source.
2. Turn Receiver power switch OFF.
3. Open blowdown valve (8) to relieve pressure and allow all fluid in connecting line to drain.

4. If Transmitter is to be out of service for maintenance or for an extended period:
 - a. Disconnect pressure tubing from outlet of valve (3).



1. OPEN VALVE 3
2. OPEN VALVE 8, BLOW DOWN TUBING, CLOSE VALVE
3. OPEN VALVE 10

FIGURE 10 - Operation of Type KP12 Transmitter

b. Disconnect flexible tubing (12) from plugged test connection and open instrument valve (10).

c. Close blowdown valve. Reconnect all tubing and close instrument valve (10).

BLOWING DOWN TUBING AND PIPING (see Figure 10)

NOTE: Blow down tubing and piping periodically to keep lines clear while instrument is in service.

ROUTINE MAINTENANCE

PERIODICALLY

1. Blow down connecting piping. Refer to "Operation", page 10, for operating procedures during blow down. Make certain all connections are tight.

1. Close instrument valve (10).
2. Open blowdown valve (8) and blow down tubing or piping until lines are clear.
3. When measuring steam pressure, allow tubing and piping to cool to room temperature.
4. Slowly open instrument valve (10).

CORRECTIVE MAINTENANCE

If system operation indicates a discrepancy in pressure measurement which is suspected or traced to the Transmitter, check the following possible sources of error.

TRANSMITTER OPERATION CHECKS

1. Transmitter must be in perfect calibration (see applicable "Pre-Service Adjustment Check").

2. The test equipment (such as that shown in Figure 6) must be accurate and sensitive.

3. Connecting piping to Transmitter must be clear and free of corrosion. Sluggish operation may indicate corrosive build-up in piping. Blow down and inspect piping (see "Blowing Down Tubing and Piping", above).

4. All connecting tubing must be air tight. Check all tubing for leakage with a leak detecting solution.

5. Check to determine if a vibration problem exists. Refer to Figure 4 for methods of eliminating vibration.

6. Faulty records or measurements are often caused by the process itself. Examine indications, records, and system component operations carefully to locate faulty component equipment.

2. Clean Transmitter. Deposits of oil and dirt make instrument operation sluggish or inaccurate.

3. Do not oil moving parts. Oil, instead of being beneficial, may cause parts to stick.

DISASSEMBLY

Normal servicing of the Transmitter does not require that any parts be removed from the Transmitter. However, if it is necessary to remove parts for corrective maintenance or replacement, remove instrument from service as outlined under "Shutting Down" on page 10. Then, with Transmitter cover removed, follow the applicable disassembly procedures below.

BOURDON TUBE (Refer to Figure 17)

1. Disconnect adjustable link (9) from Bourdon tube tip.

2. Grasp pointer mechanism and remove two screws (30).

3. Carefully push pointer mechanism up and backward.

4. Then disconnect connecting link (32) from adjustable pointer range arm. (Do not damage hair spring while removing link.)

5. Remove three screws (29) from Bourdon tube and block assembly (28).

6. Disconnect Bourdon tube pressure connection (23) at measured pressure port and remove connection from Bourdon tube block (note hole from which connection was removed for correct reassembly). Replace Bourdon tube and reconnect connection (23) to Bourdon tube block but do not tighten.

7. Reconnect connection (23) at measured pressure port, making certain Bourdon tube and block mounting pins (at back of assembly) are aligned.

8. Hold block and tighten three screws (29). Then tighten connection (23) at block.

9. Reconnect link (32).

10. To complete reassembly, perform the operations in steps 1, 2, and 3 in reverse order.

CALIBRATION OF TRANSMITTER

CALIBRATION CHECK

Before making the Transmitting Mechanism and Indicating Mechanism calibration adjustments below, make the applicable "Pre-Service Adjustment Checks" under "Installation." If, after making these checks, the Transmitter does not operate correctly, perform the complete calibration adjustments outlined below.

NOTE: Adjust Transmitting Mechanism before attempting to correct the calibration of the Indicating Mechanism.

TRANSMITTING MECHANISM

1. Connect Transmitter in calibration setup similar to that shown in Figure 6.

2. Apply midrange pressure to Bourdon tube. Transmitter linkage should appear similar to the arrangement shown in Figure 13. If not, make the following adjustments:

a. Loosen connecting link screw and adjust length of adjustable connecting link so adjustable connecting link makes about a 90° angle with Transmitter range arm (Angle A).

b. Loosen three MCT locking screws (Figure 11). Set MCT core in about midtravel position by turning eccentric screw to shift MCT locking plate. (Position of MCT core can be determined by observing position of pin in slot at base of MCT.) Tighten locking screws.

3. Check that Receiver pen reads 50% chart.

a. If Receiver reading is correct, proceed to step 4.

b. If Receiver reading is incorrect, loosen MCT null adjustment locking screw (Figure 12) and turn MCT null adjustment until Receiver reads 50% chart. Tighten locking screw.

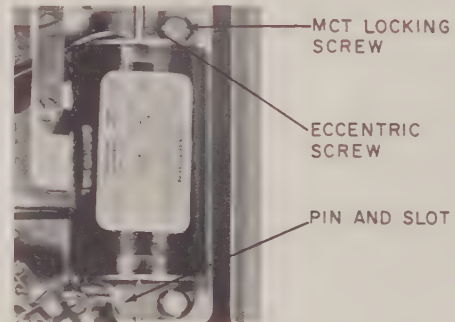


FIGURE 11 - MCT Locking Screws and Eccentric

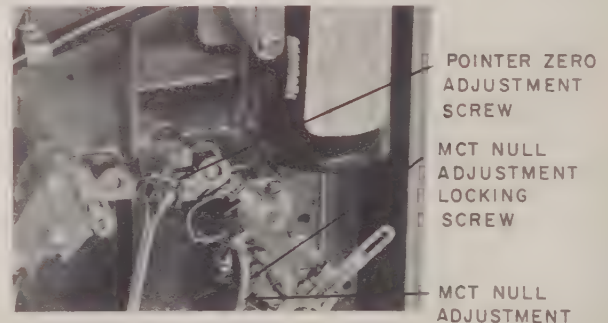


FIGURE 12 - MCT Null Adjustment

NOTE: Check Transmitter indicating pointer reading. If pointer does not read within one scale division of 50% scale, turn pointer zero adjustment screw (Figure 12) until pointer reads about 50% scale. This adjustment is not part of the Transmitting Mechanism calibration, but prevents incorrect readings caused by the pointer hitting the mounting bosses.

4. Apply 10% and 90% measured pressure range to Bourdon tube. Observe Receiver chart readings. Note whether Receiver pen travel from midrange chart toward 10% chart is equal to pen travel from midrange chart toward 90% chart.

NOTE: This check is to determine if Receiver pen motion is linear, and 90% and 10% Receiver readings need not correspond to applied pressure at this time.

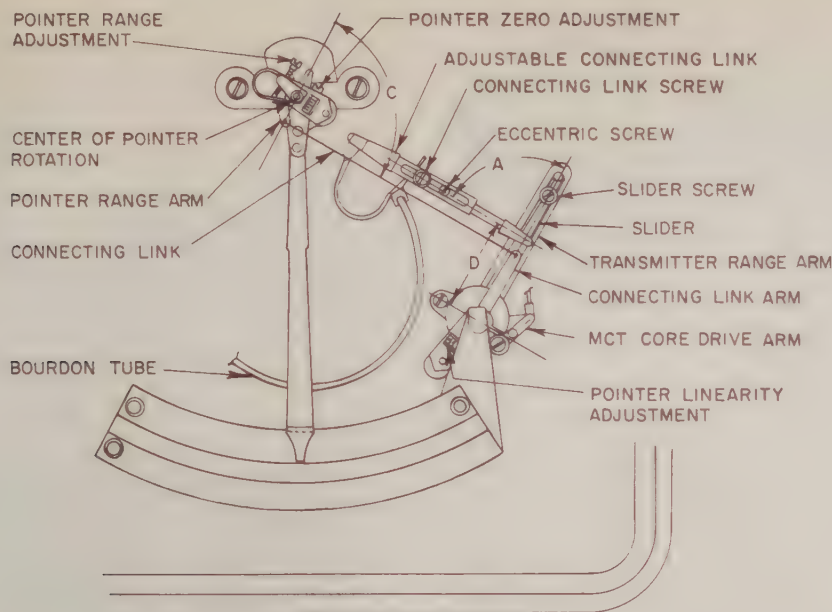


FIGURE 13 - Type KP12 Transmitter Adjustments at 50% Scale

If Receiver pen travel is equally divided on both sides of midrange chart, proceed to step 5. If travel is not equally divided, apply midrange pressure to Bourdon tube, loosen adjustable connecting link (Figure 13), and adjust length of adjustable connecting link as follows:

a. Increase link length to increase pen travel beyond midrange and to decrease pointer travel below midrange.

b. Decrease link length to decrease pen travel beyond midrange and to increase pen travel below midrange.

The amount of this adjustment should be about double the error observed between 10% and 90% chart readings. For example, if Receiver pen travel from midrange toward 10% exceeded Receiver pen travel from midrange toward 90% by two scale divisions, adjust link so as to increase reading at midrange by four scale divisions.

5. Repeat steps 3 and 4 until pen travel is uniform.

6. Apply 90% measured pressure range to Bourdon tube. If Receiver does not read 90% chart, loosen slider screw (Figure 13) and adjust position of slider on range arm to obtain correct reading by:

a. Decreasing Dimension D to increase Receiver reading, or

b. Increasing Dimension D to decrease Receiver reading.

c. Tighten slider screw.

d. Apply midrange pressure to Bourdon tube. If Receiver does not read midrange pressure, loosen Transmitter MCT null locking screw and turn MCT null adjustment screw (Figure 12) to obtain correct reading. Tighten locking screw.

e. Repeat step 6 until 90% and midrange readings are correct.

7. Apply 10% measured pressure range to Bourdon tube. If Receiver does not read 10% chart, linear motion of the Receiver pen (obtained in step 4) has been disturbed. Repeat the adjustments in steps 4, 5, and 6 until 90%, 10% and 50% chart readings are correct when corresponding measured pressure is applied to the Bourdon tube.

8. Check Indicating Mechanism calibration as outlined on page 14.

INDICATING MECHANISM

The function of the Type KP12 Pressure Transmitter is to transmit an electrical signal representing a measured pressure. The indicating pointer is intended merely as a guide and its accuracy need not match that of the Transmitting Mechanism. In the final calibration check, step 9 below, the indicating pointer should read correctly within 1/32-inch.

1. Apply midrange measured pressure to Bourdon tube. If indicating pointer reads mid-scale, proceed to step 3. If pointer reading is incorrect, turn pointer zero adjustment screw (Figure 13) until scale reading is correct. Turn counterclockwise to decrease reading or clockwise to increase reading. (Linkage should appear similar to that shown in Figure 13.)

2. The point at which the connecting link is attached to the pointer range arm should make about a 90° angle with the center of pointer rotation (Angle C). Turn pointer zero adjustment to obtain this relationship.

3. Loosen pointer linearity adjustment locking screw (Figure 14) and turn pointer linearity adjustment screw until pointer reads midscale. Tighten locking screw.

NOTE: Adjusting the pointer linearity adjustment screw rotates the lower pivot shaft with respect to the Transmitter range arm, thus changing the null position of the Transmitter MCT core. Reset the MCT null adjustment by loosening the MCT null adjustment locking screw and turning the MCT null adjustment screw until Receiver reads 50% chart. Tighten locking screw.

4. Apply minimum, midrange, and maximum range pressure to Bourdon tube. Note whether pointer travel from midscale toward minimum scale is equal to pointer travel from midscale toward maximum scale.

NOTE: This determines whether indicating pointer motion is linear, and maximum and minimum scale readings need not correspond to applied pressures at this time.

If pointer travel is equally divided on both sides of midscale, proceed to step 5. If not, apply midrange pressure to Bourdon tube, loosen pointer linearity adjustment locking screw, and turn pointer linearity adjustment screw (Figure 14) as follows:

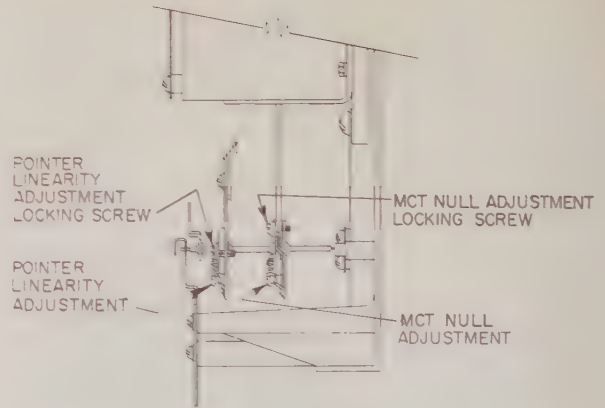


FIGURE 14 - MCT Null and Pointer Linearity Adjustments

a. Turn screw counterclockwise to increase pointer travel beyond midscale and to decrease pointer travel below midscale.

b. Turn screw clockwise to decrease pointer travel beyond midscale and to increase pointer travel below midscale.

The amount of this adjustment should be about double the error observed between minimum and maximum scale readings. For example, if pointer travel from midscale to minimum scale exceeded pointer travel from midscale to maximum scale by two scale divisions, turn pointer linearity adjustment screw to increase reading at midscale by four scale divisions.

c. Tighten pointer linearity adjustment locking screw.

d. Reset pointer at midscale by turning pointer zero adjustment screw (Figure 13).

e. Repeat steps 3 and 4 until pointer travel is uniform.

5. Apply maximum range pressure to Bourdon tube. If pointer does not read maximum range, turn pointer range adjustment screw (Figure 13) clockwise to decrease reading or counterclockwise to increase pointer travel.

6. Apply midrange pressure to Bourdon tube. If pointer does not read midrange pressure, turn pointer zero adjustment screw to correct reading.

7. Repeat steps 5 and 6 until maximum and midscale readings are correct.

8. Apply minimum range pressure to Bourdon tube. If pointer does not read minimum scale, linear motion of the indicating pointer (obtained in step 4) has been disturbed. Repeat the adjustments in steps 4 and 5 until correct readings are obtained.

9. Make a final check to determine that Receiver readings and Transmitter indicating pointer scale readings are correct when minimum, maximum, and midrange pressures are applied to the Bourdon tube.

BOURDON TUBE STOPS

1. Set minimum travel stop (Figure 15) by manually positioning Bourdon tube end stop so that indicating pointer reads 1/16 inch to 1/32 inch less than minimum scale mark. Loosen minimum stop screw and position next to Bourdon tube end. Then tighten screw securely.

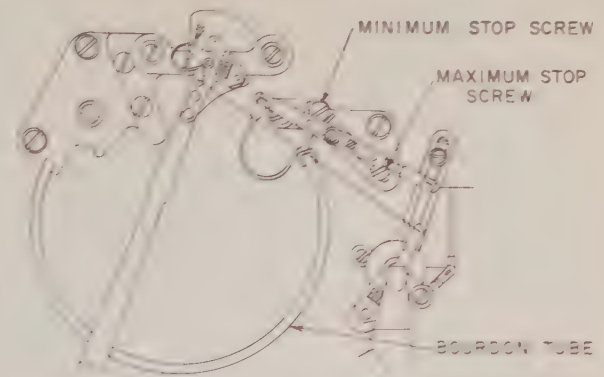


FIGURE 15 - Minimum and Maximum Stop Screws

2. Set maximum travel stop by manually positioning Bourdon tube end stop so that indicating pointer reads 1/16 inch to 1/32 inch more than maximum scale mark. Loosen maximum stop screw and position next to Bourdon tube end. Then tighten screw securely.

DESCRIPTION OF OPERATION

The measuring and indicating mechanism of the transmitter (Figure 16) consists of a Bourdon tube connected by linkage to an indicating pointer and MCT (movable core transformer) core drive arm. Measured pressure is applied to the Bourdon tube causing it to move. This motion is transmitted thru linkage to position the indicating pointer and the MCT core drive arm.

The Transmitting mechanism is an MCT (refer to Figure 9). The MCT consists of a solenoid coil with a single primary winding and one (Model K) or two (Model P) secondary windings. A plunger-type core is placed in the bore of the coil and the position of the core determines the voltage induced in the secondary winding(s).

When the measured pressure increases, the free end of the Bourdon tube is displaced in proportion to the measured pressure. This motion is transmitted thru linkage to position the indicating pointer and the MCT core drive arm, causing the core to move downward in the MCT. As the position of the core varies, the voltage(s) across the secondary winding(s) varies to produce a signal output voltage proportional to the measured pressure.

When measured pressure decreases, all movement is in the opposite direction to that described above.

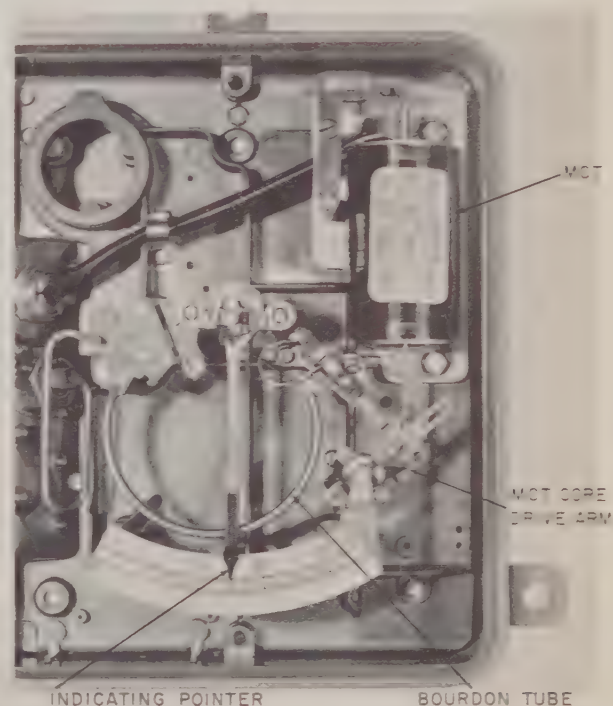
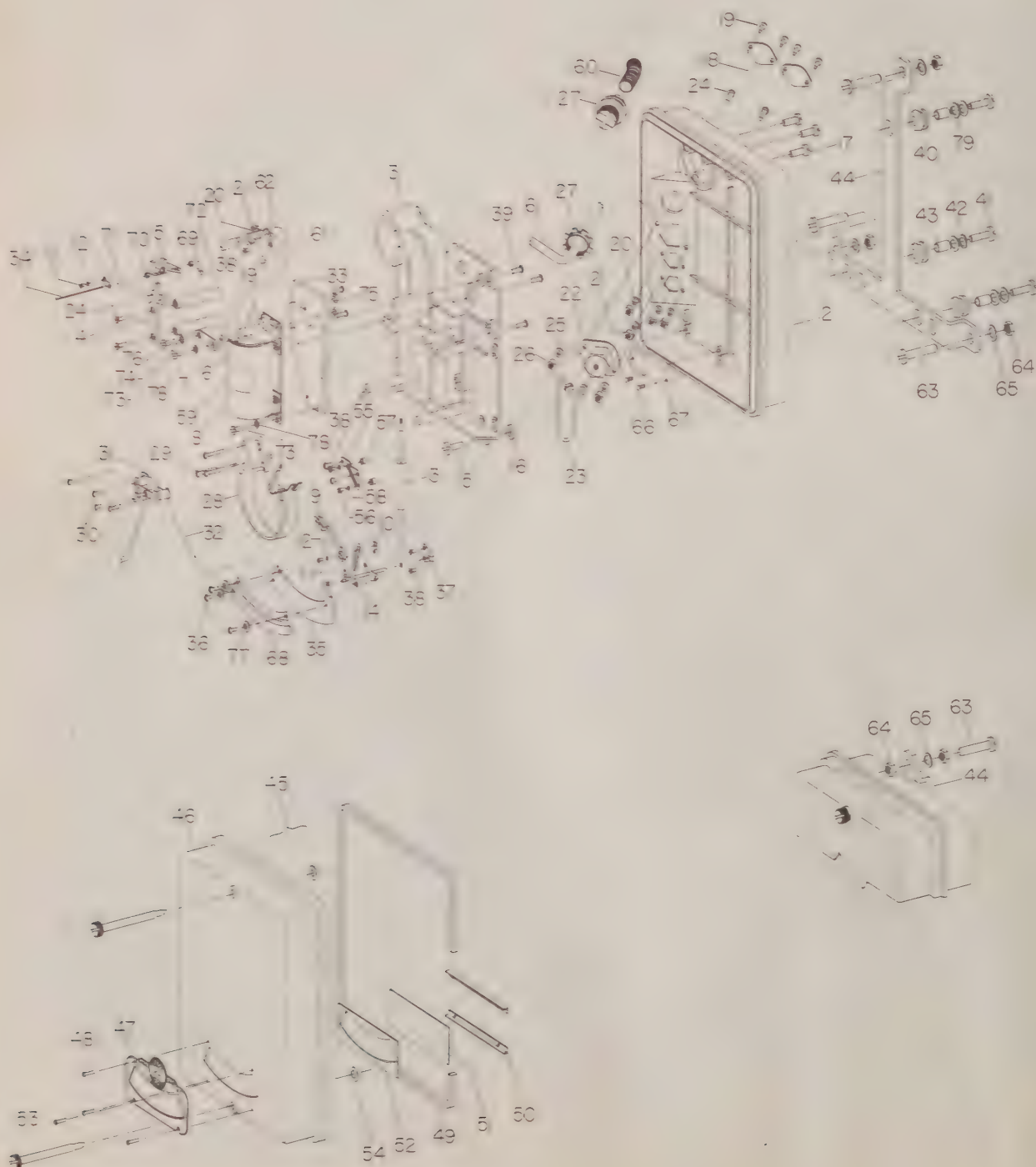


FIGURE 16 - Type KP12 Transmitter Mechanism



REPLACEMENT PARTS

ORDERING INDIVIDUAL PARTS

Figure 17 is a Parts Drawing of the Type KP12 Pressure Transmitter. Normally, this drawing applies to the Transmitter furnished. However, there may be individual differences in specific units because of:

a. design changes made since the printing of this Instruction Section, or

b. special design of the Transmitter to make it suitable for a special application.

Therefore, when ordering parts, assure receipt of correct replacements by specifying on the order:

1. Complete identification including the nomenclature, part number, and serial number of the assembly.

2. Parts Drawing number on which each part is illustrated.

ITEM	PART NO.	NAME	ITEM	PART NO.	NAME	ITEM	PART NO.	NAME
1	SEE NOTE	CODE LABEL	28	SEE TABLE	TUBE & BLOCK ASSY	56	68864-1	STOP SCREW, 2 REQD
2	68806-1	HOUSING	29	6-32x7/8	PAN HD SST SEMS EXT, 3 REQD	57	68865-1	NUT, 2 REQD
3	681651-2	MECH SUPPORT BRKT	30	4-40x5/16	PAN HD SST SEMS EXT, 2 REQD	58	1604-00	SHPRF SST LKWASH, 2 REQD
4	6617032-1	SHAFT SUPPORT	31	666624-1	POINTER MECH ASSY	59	1961155-1	INSTRUCTION LABEL
5	6617034-1	CTWT & DRIVE ARM ASSEMBLY	32	667572-1	LINK	60	27"	.263 ID X .020 WALL (NOMINAL) RUB. TUBING
6	666297-1	ECCENTRIC	33	6617031-2	MOUNTING PLATE	61	38"	1/2" ID X .617 OD (NOMINAL) FLEX. STL TUBING
7	666296-1	ECCENTRIC RET PLATE	34	667693-2	PIVOT SHAFT	62	666368-2	CABLE SUPPORT
8	6618596-1	COIL & SUPPORT ASSY FOR MODEL K	35	667118-1	UPPER BEARING PLATE	63	5/16-18x1-1/4	PAN HD SCR, 3 REQD
	6618596-2	COIL & SUPPORT ASSY FOR MODEL P	36	3-48x5/16	PAN HD SST SCR, 3 REQD	64	5/16-18	STL HEX JAM NUT, 6 REQD
9	666957-1	LINK ASSEMBLY	37	666970-1	LOWER BEARING PLATE	65	118-00	SHPRF LKWASH, 3 REQD
10	667571-1	DRIVE ARM SLIDER	38	6-32x1/4	PAN HD SST SEMS EXT, 5 REQD	66	0-1/8	RD HD SST THD FORMING SCR TYPE-U, 2 REQD
11	2-56x1/8	PAN HD SST SCR, 2 REQD	39	10-32x3/8	PAN HD SST SEMS EXT, 3 REQD	67	196776-1	NAMEPLATE
12	NO. 2 SAE	SST WASHER, 2 REQD	40	681441-1	GROMMET, 3 REQD	68	68930-1	SCALE, SPECIFY RANGE
13	667243-1	PLUNGER ASSEMBLY	41	5/16-18x3/4	PAN HD STL SCR, 3 REQD	69	49126-1	SPECIAL SCR, 2 REQD
14	6615428-1	PIVOT SHAFT ASSY	42	19734-17	WASHER, 3 REQD	70	49182-1	SHAFT COLLAR, 2 REQD
15	10-32x3/8	PAN HD SST SEMS EXT	43	681442-1	SPACER, 3 REQD	71	312097-1	LINK SPRING END
16	19934-32	SPACER	44	68856-1	MOUNTING STRAP	72	35390-1	STUD, 2 REQD
17	1/4x20x3/4	PAN HD SST SEMS EXT, 3 REQD	45	68854-1	COVER ASSY INCLUDES ITEMS 46 THRU 54	73	10-32x5/16	PAN HD SST SCR, 2 REQD
18	5317034-1	COVER PLATE	46	68855-1	COVER	74	532172-1	SPRING WASHER
19	6-32x5/16	PAN HD SST SCR, 5 REQD	47	196778-1	STYLING PLATE	75	197120-5	ELASTIC STOP NUT
20	1606-00	SHPRF SST LKWASH, 5 REQD	48	2x3/8	TYPE 2 SELF TAPPING SCREW, 4 REQD	76	10-32x3/4	PAN HD SST SCR
21	6-32	SST HEX NUT, 5 REQD	49	5316543-1	SEALING STRIP	77	1703-00	SST SHPRF LKWASH, 3 REQD
22	SEE TABLE	CONNECTOR ASSY	50	511184-3	CLAMP	78	1610-100	SST SHPRF LKWASH, 2 REQD
23	SEE TABLE	BOURDON TUBE PRESSURE ASSEMBLY	51	681169-1	WINDOW	79	1218-00	SST SHPRF LKWASH, 3 REQD
24	8-32x5/16	PAN HD SST SCR, 6 REQD	52	68522-1	GASKET			
25	1608-00	SHPRF SST LKWASH, 2 REQD	53	5311409-2	COVER SCR, 2 REQD			
26	8-32	SST HEX NUT, 2 REQD	54	198173-16	RETAINING RING, 2 REQD			
27	197118-2	CONDUIT CONNECTOR	55	68863-1	STOP PLATE			

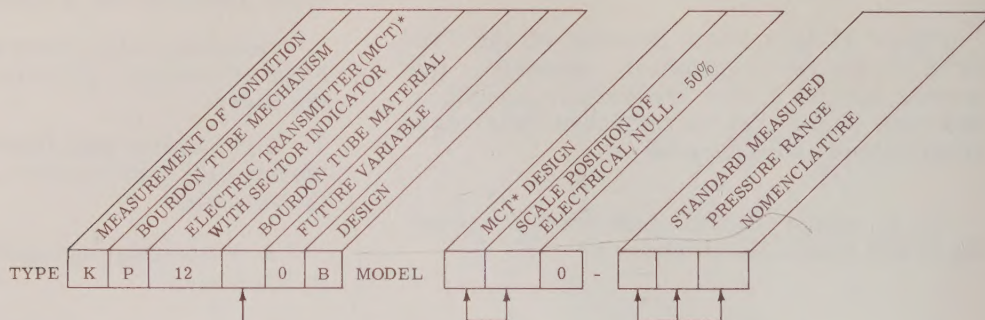
NOTE: WHEN ORDERING PARTS, SPECIFY NUMBER ON CODE LABEL (ITEM 1).

TABLE				
TYPE	MODEL	ITEM 22	ITEM 23	ITEM 28
KP1210	--	OMIT*	OMIT*	6610195-□
KP1220	□013 thru □042, □055 thru □082, □102 thru □221	68848-1	666598-1	667560-□
	□044, □084, □222	6610560-1	682873-1	
KP1250	--	OMIT*	OMIT*	6619289-□

*ITEMS 22 AND 23 INCLUDED IN TUBE AND BLOCK ASSEMBLY, ITEM 28.

FIGURE 17 - Parts Drawing E41-43, Type KP12 Transmitter

EXPLANATION OF NOMENCLATURE



	Bourdon Tube Material	Pressure Limits	
		Min. - Max.	Min. - Max.
1	Beryllium Copper	4001-8000 psig	281-562 kg/cm ²
2	Ni Span C	30-4000 psig	2.11-281 kg/cm ²
5	Type 316L Stainless	30-4000 psig	2.11-281 kg/cm ²

See Note	Output Signal Range
KA	2.5 - 0 - 2.5 VAC
PA	2.5 - 0 - 2.5 VAC

STANDARD RANGE NOMENCLATURE							
ENGLISH UNITS				METRIC UNITS			
Nomenclature	Pressure Range, psig	Nomenclature	Pressure Range, psig	Nomenclature	Pressure Range, kg/cm ²	Nomenclature	Pressure Range, kg/cm ²
013	0-30	044	0-4000	102	0-2	150	0-50
014	0-40	045	0-5000	103	0-3	151	15-50
015	0-50	046	0-6000	104	0-4	160	0-60
016	0-60	048	0-8000	105	0-5	162	20-60
017	0-70	055	20-50	106	0-6	173	35-70
018	0-80	058	20-80	108	0-8	180	0-80
020	0-100	063	100-300	110	0-10	182	20-80
021	0-150	064	100-400	115	0-15	200	0-100
022	0-200	065	200-500	120	0-20	203	30-100
023	0-300	067	200-700	121	5-20	210	0-150
027	0-160	068	300-800	122	10-20	220	0-200
024	0-400	070	500-1000	125	0-25	221**	50-200
025	0-500	071	300-1100	130	0-30	222**	50-250
026	0-600	072**	600-1200	132**	10-30	230	0-300
028	0-800	073	400-1200	133**	15-35	240	0-400
030	0-1000	075	500-1500	140	0-40	250	0-500
032	0-1200	080	500-2000				
035	0-1500	081	500-2500				
040	0-2000	082	500-3000				
041	0-2500	084	500-4000				
042	0-3000						

NOTE:

- Model K designed for one output signal. Model P designed for two output signals.
- Electrical null is position of core within MCT* at which electrical outputs across each set of secondary windings are equal.

* Movable Core Transformer

**These ranges are unattainable with the Type KP1250 Pressure Transmitter.

An "X" in any Nomenclature position indicates that the variation is special. An "X" as a suffix to either Type or Model indicates that the Transmitter includes some special feature not covered by the standard Nomenclature.

Product Warranty

Bailey Meter Company warrants the products manufactured by it to be free from defects in material and workmanship and will repair or replace, at its option, free of charge, f.o.b. its factory, such part or parts which prove defective within one year from date of shipment. In respect to any products which are not an integral part of a product manufactured by the Company, the warranty given by the manufacturer thereof shall apply.

Shipping Damage

We strongly recommend that you inspect and test your instrument as soon as you receive it. If the instrument is damaged or operates improperly, notify the carrier for inspection of the shipment. The carrier's claim agent will prepare a report of damage, a copy of which should be forwarded to your nearest Bailey District Office (see back cover for location). The District Office will then tell you how to have the instrument repaired or replaced.

Service

The Bailey Meter Company is vitally concerned that your Bailey instrument provides continued, fine performance. This instruction manual is designed to fully describe the correct installation, operation, and maintenance of your instrument under recommended conditions. If the need arises, factory-trained Service Engineers are on call for prompt, in-plant maintenance. Telephone or wire your nearby Bailey District Office to make arrangements for this service (see back cover for location and telephone number).

Replacement Parts and Supplies

Complete parts drawings and recommended spare parts kit information are included in this instruction manual. When replacement parts or supplies are required for maintenance of your Bailey instrument, contact your nearest Bailey District Office (see back cover for location). Always specify complete data on the instrument nameplate on your inquiry or order for parts. Common parts are available for shipment within 48 hours on a speed-order basis.

BAILEY METER COMPANY DISTRICT OFFICES, U.S.A.

CALIFORNIA		NEW YORK	
San Francisco Code 415	Phone 781-0926	Buffalo Code 716	Phone 839-3662
Los Angeles Code 213	Phone 283-1187	New York Code 212	Phone 986-8770
COLORADO		Schenectady Code 518	Phone 374-7991
Denver Code 303	Phone 322-7745	NEW JERSEY	
GEORGIA		East Orange Code 201	Phone 674-6830
Atlanta Code 404	Phone 378-4348	NORTH CAROLINA	
ILLINOIS		Charlotte Code 704	Phone 334-9161
Chicago Code 312	Phone 427-7324	OHIO	
LOUISIANA		Cincinnati Code 513	Phone 281-0132
New Orleans Code 504	Phone 488-0841	Cleveland Code 216	Phone 851-8600
MASSACHUSSETS		PENNSYLVANIA	
Boston Code 617	Phone 426-0465	Philadelphia Code 215	Phone 664-3282
MICHIGAN		Pittsburgh Code 412	Phone 921-6356
Detroit Code 313	Phone 357-0440	TEXAS	
MINNESOTA		Dallas Code 214	Phone 363-6295
St. Paul Code 612	Phone 645-7752	Houston Code 713	Phone 526-1628
MISSOURI		WASHINGTON	
Kansas City Code 816	Phone 361-4902	Seattle Code 206	Phone 324-9300
St. Louis Code 314	Phone 962-5532	WISCONSIN	
		Milwaukee Code 414	Phone 461-1310

BAILEY METER COMPANY LTD., CANADA

ALBERTA		ONTARIO	
Edmonton Code 403	Phone 488-3436	Ottawa Code 613	Phone 722-1373
BRITISH COLUMBIA		Toronto Code 416	Phone 444-8488
Vancouver Code 604	Phone 731-3709	QUEBEC	
MANITOBA		Montreal Code 514	Phone 489-3881
Winnipeg Code 204	Phone 943-1481		
NOVA SCOTIA			
Halifax Code 902	Phone 455-0574		

Bailey

Bailey Meter Company • Wickliffe, Ohio 44092
In Canada: Bailey Meter Company Limited, Montreal, Canada